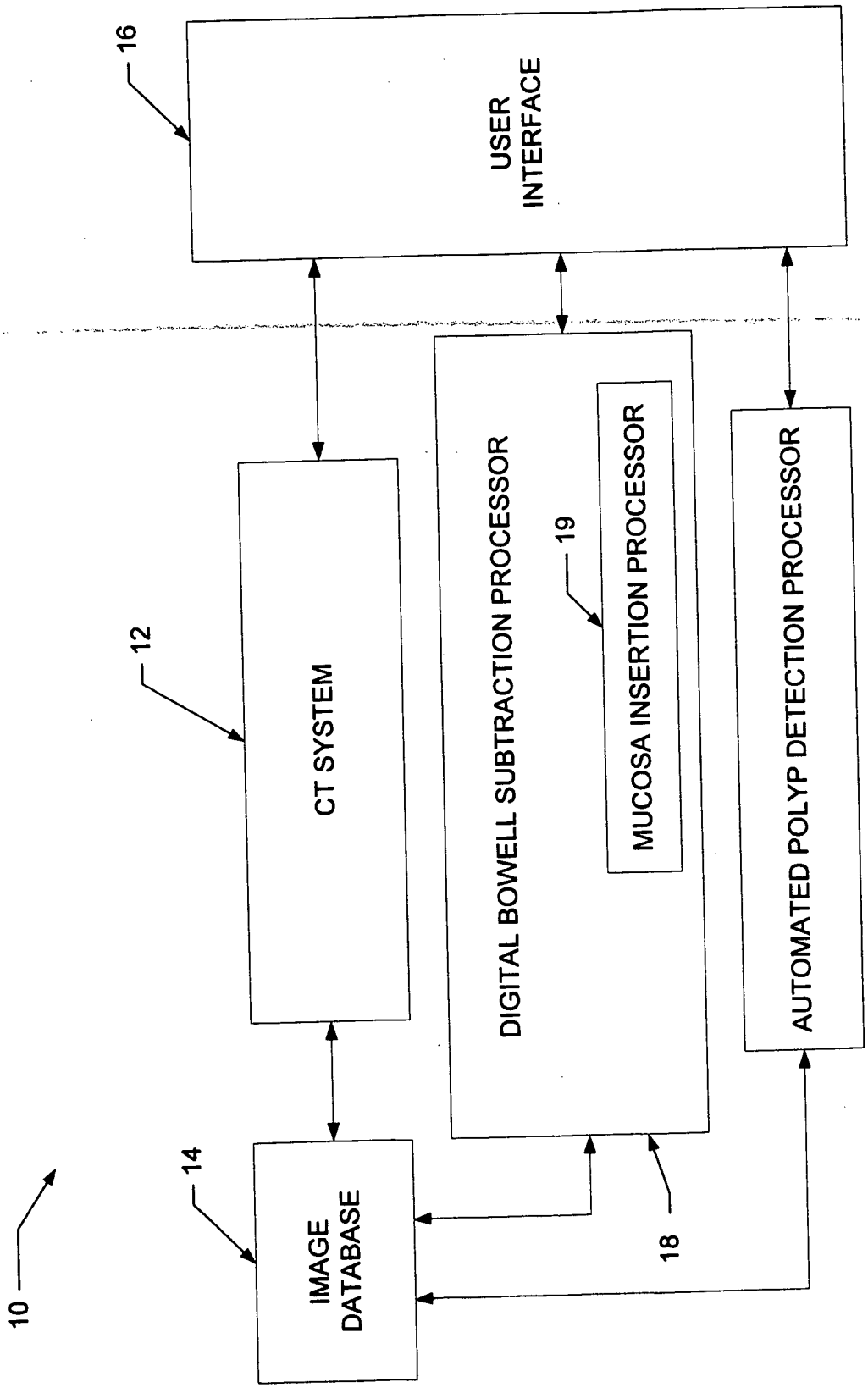

16
USER INTERFACE
12
CT SYSTEM
DIGITAL BOWELL SUBTRACTION PROCESSOR
19
MUCOSA INSERTION PROCESSOR
AUTOMATED POLYP DETECTION PROCESSOR
14
IMAGE DATABASE
18
20
10

FIG. 1

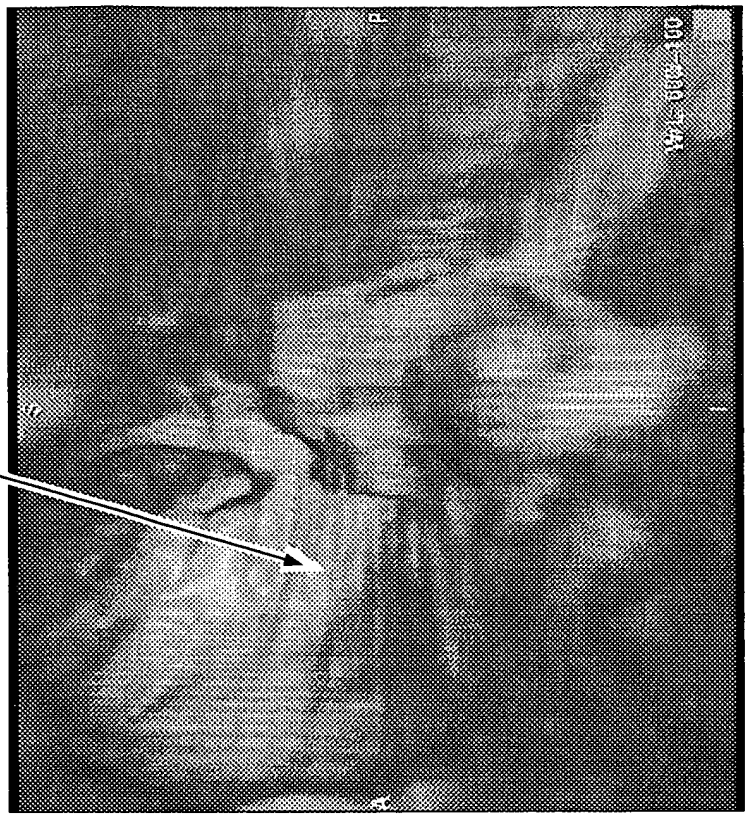


FIG. 1B

19B

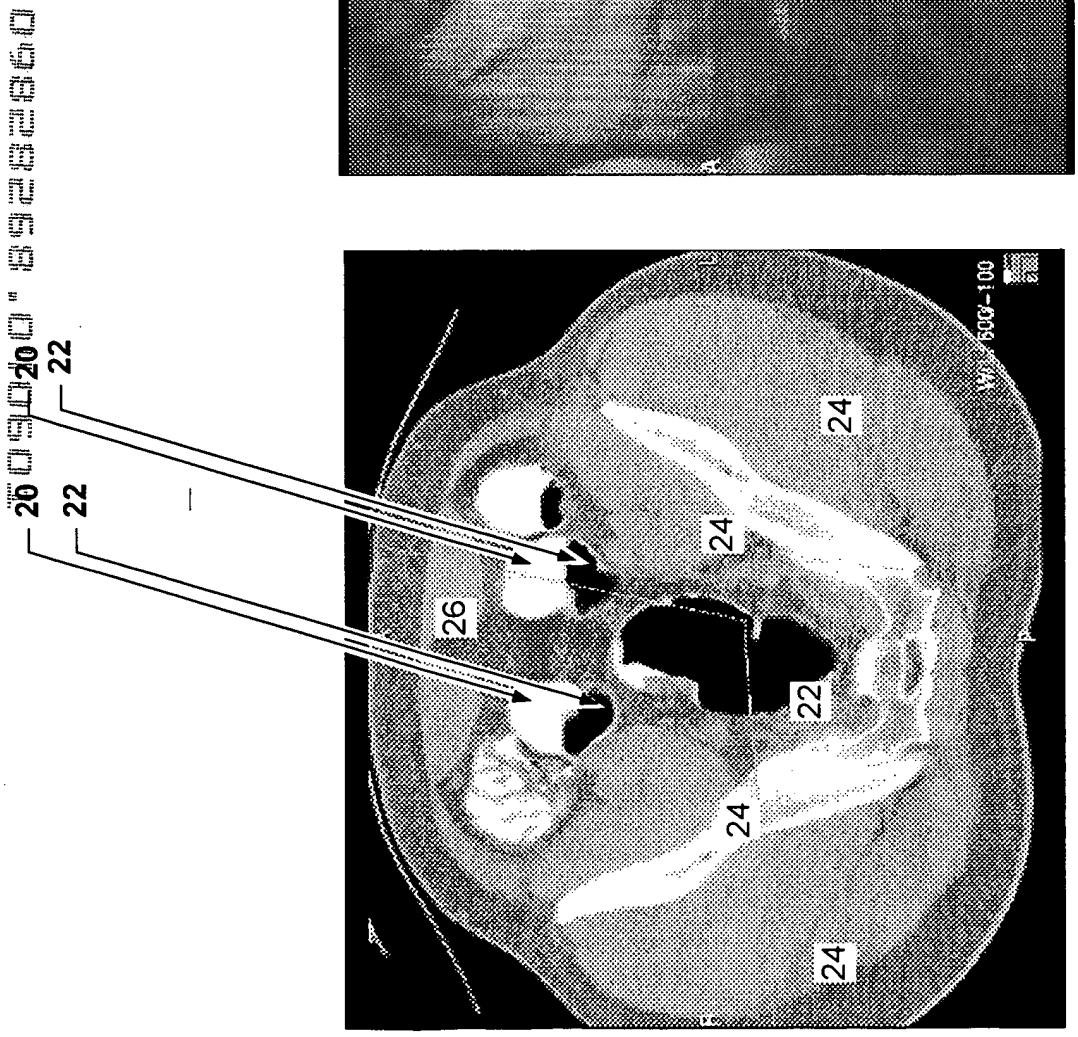


FIG. 1A

19A

FIG. 1D

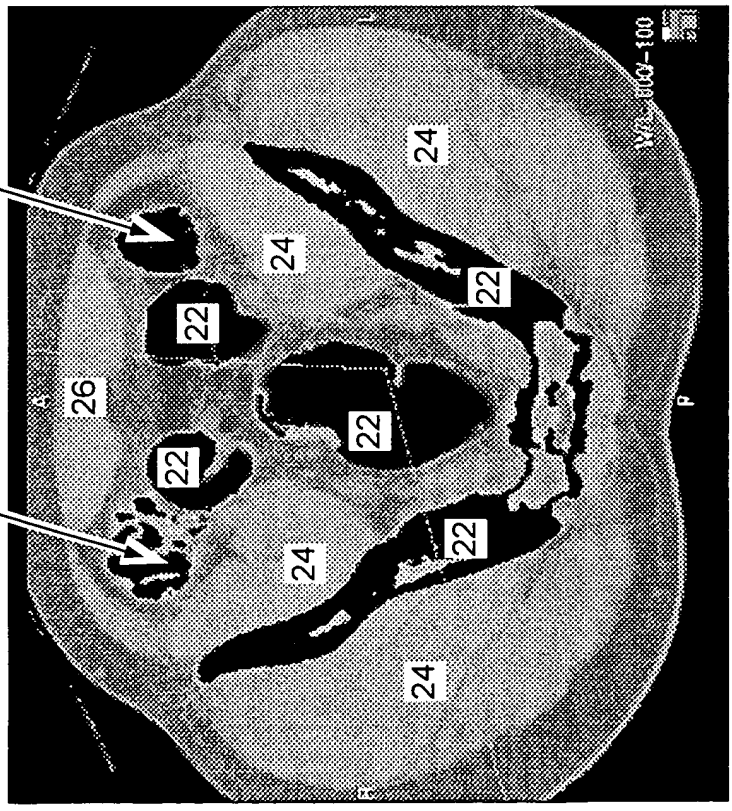


FIG. 1C

09826966 - 040601

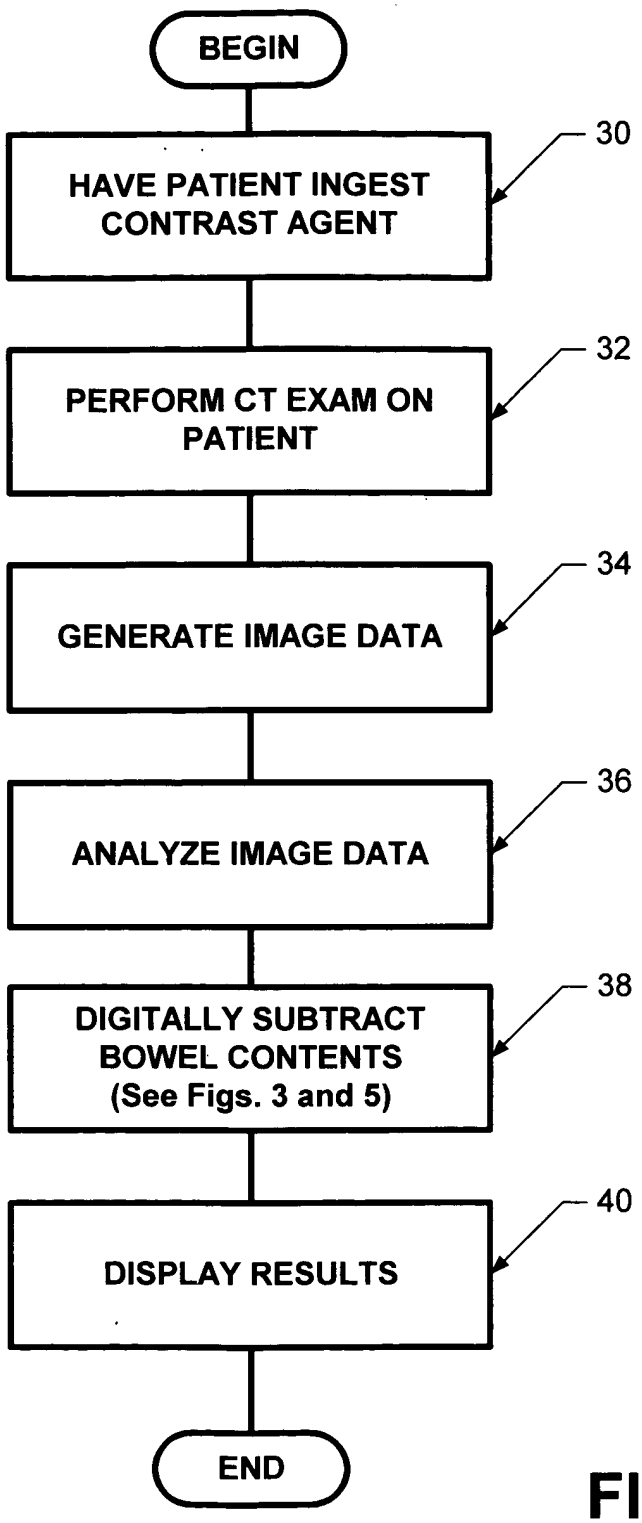


FIG. 2

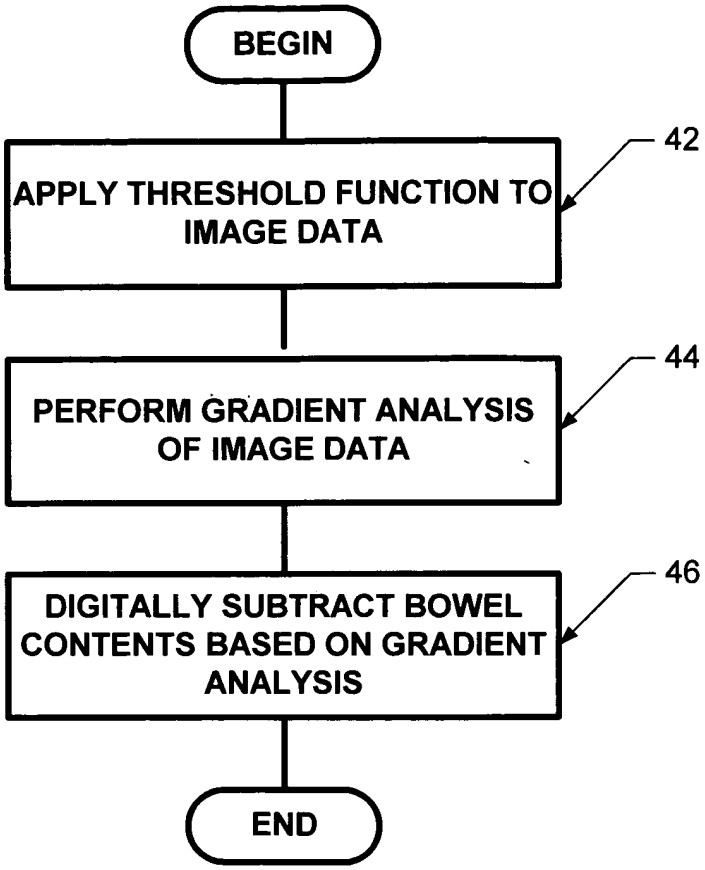


FIG. 3

09820869 - 040501

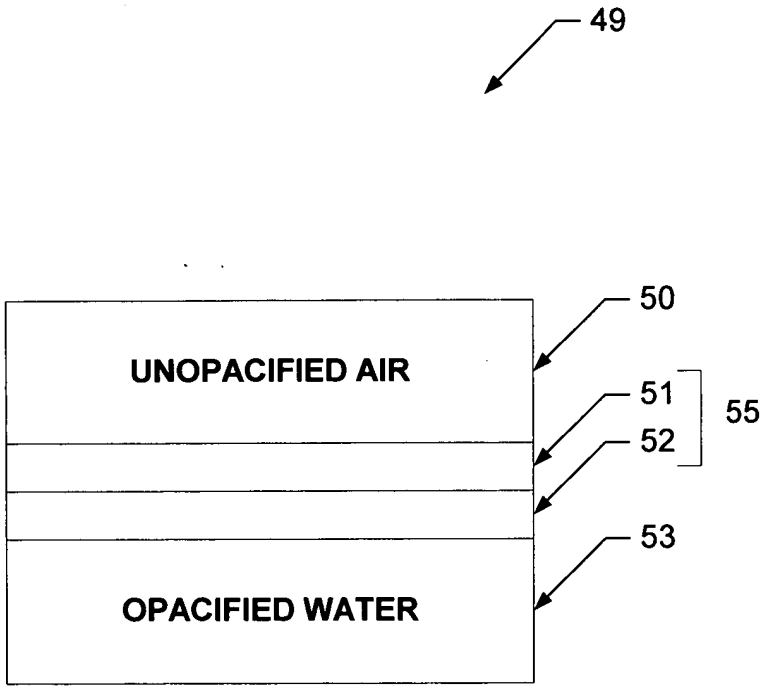


FIG. 4

Doc Code: Oath

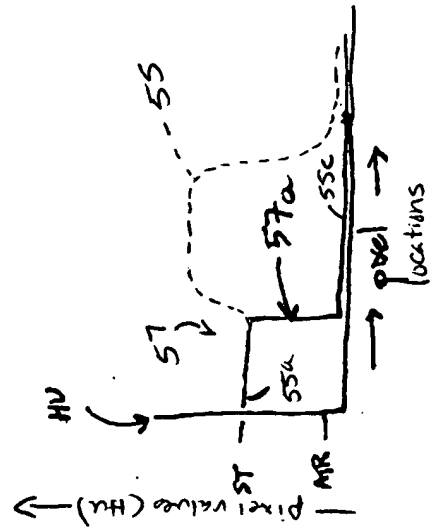


Fig. 4B

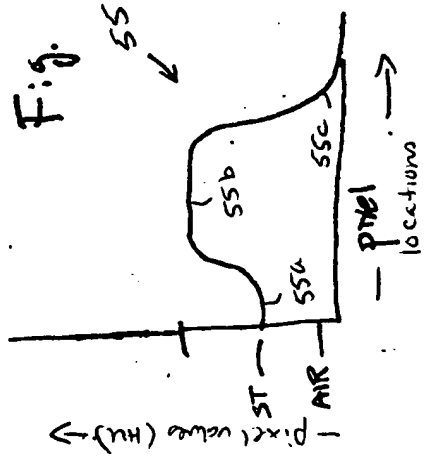


Fig. 4A

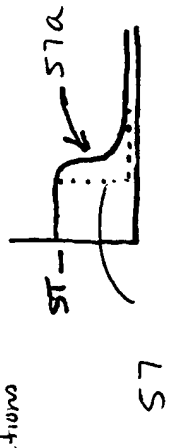


Fig. 4C

US 6,909,794 B2

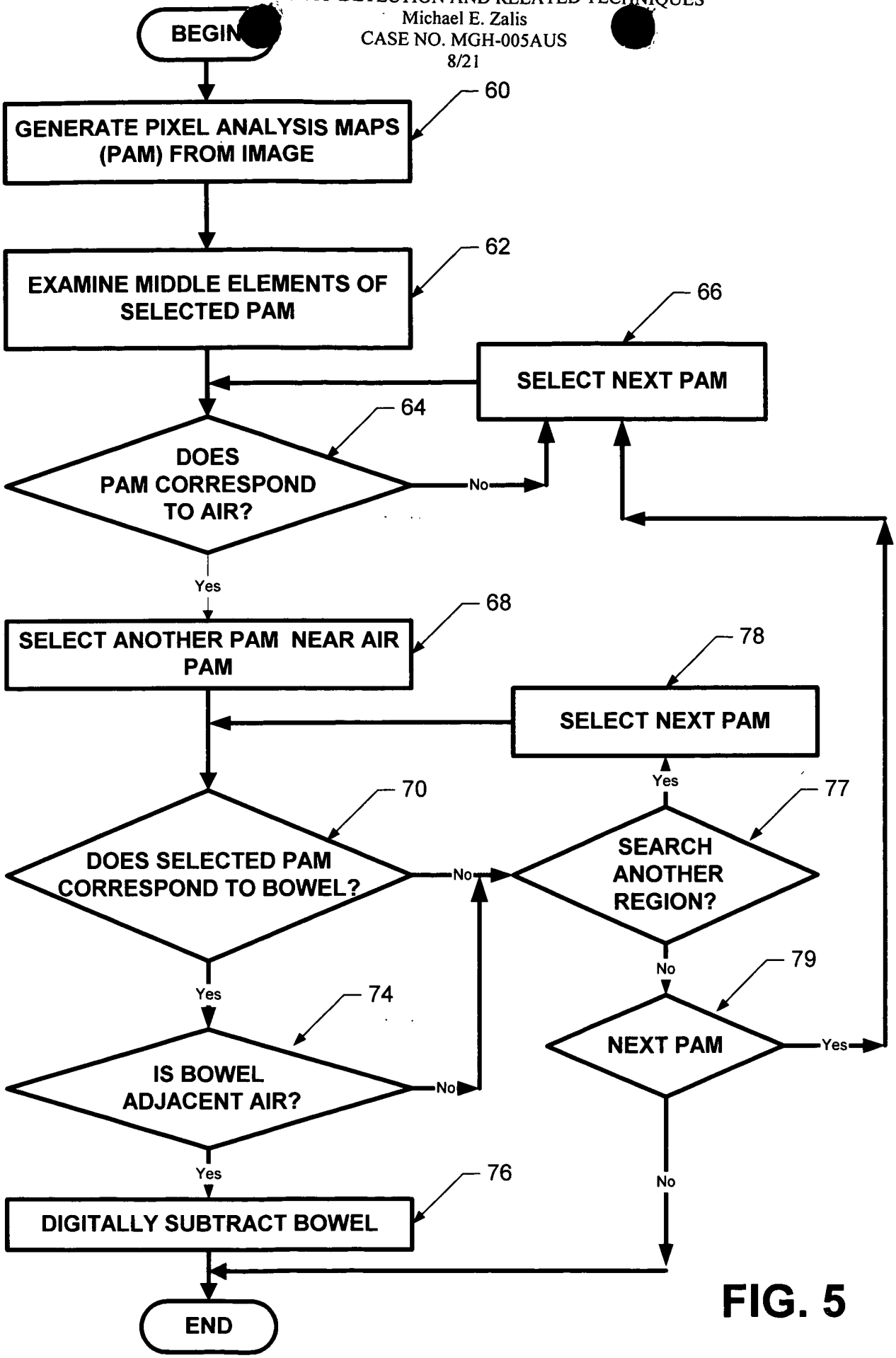

BEGIN
GENERATE PIXEL ANALYSIS MAPS (PAM) FROM IMAGE
60
EXAMINE MIDDLE ELEMENTS OF SELECTED PAM
62
SELECT NEXT PAM
66
DOES PAM CORRESPOND TO AIR?
64
No
Yes
SELECT ANOTHER PAM NEAR AIR PAM
68
SELECT NEXT PAM
78
DOES SELECTED PAM CORRESPOND TO BOWEL?
70
No
SEARCH ANOTHER REGION?
77
Yes
No
Yes
IS BOWEL ADJACENT AIR?
74
No
NEXT PAM
79
Yes
Yes
No
DIGITALLY SUBTRACT BOWEL
76
END

FIG. 5

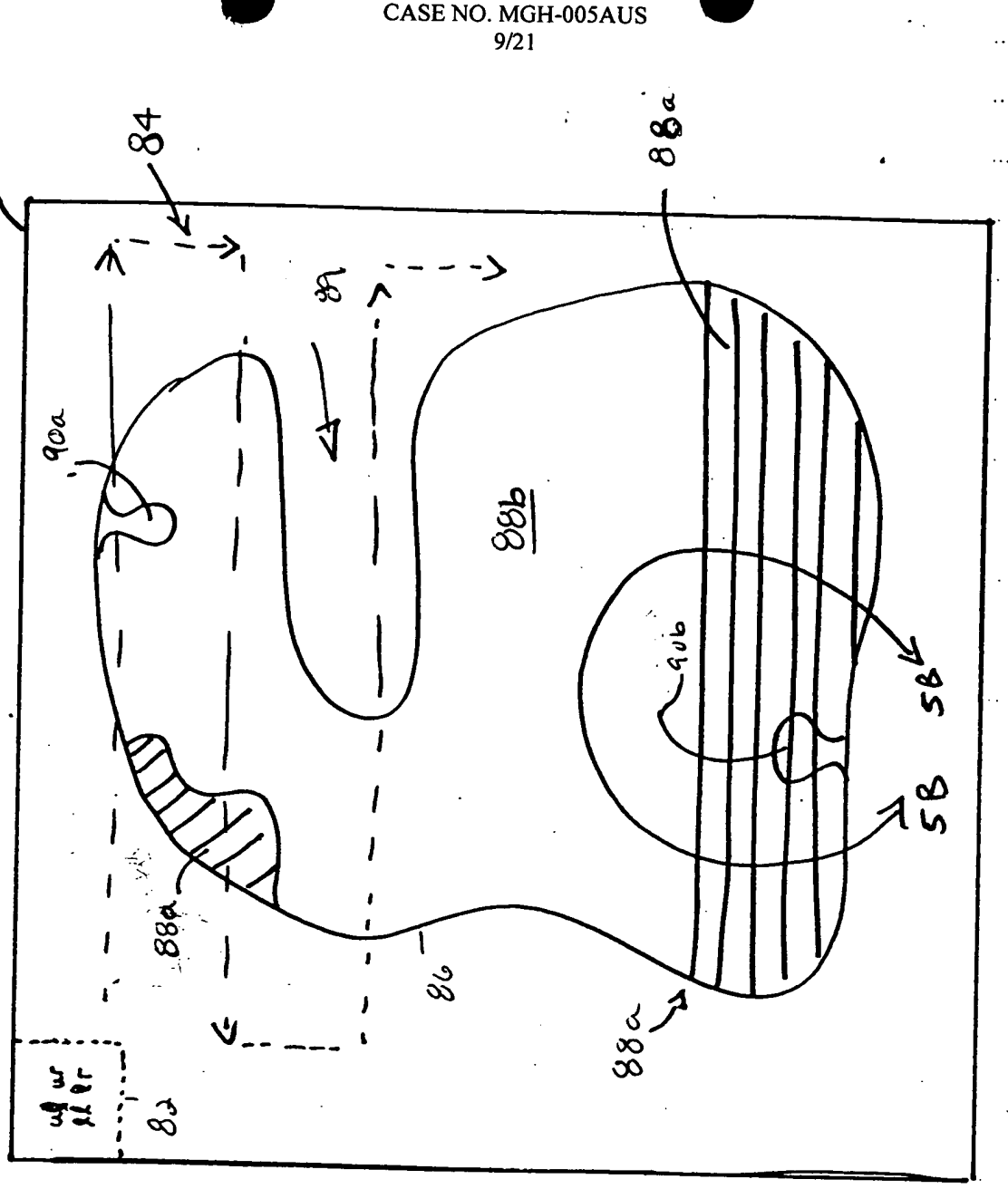


Fig. 5A

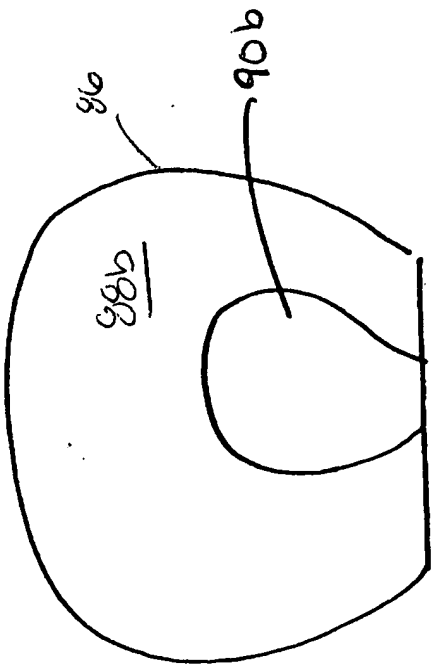


FIG 5C

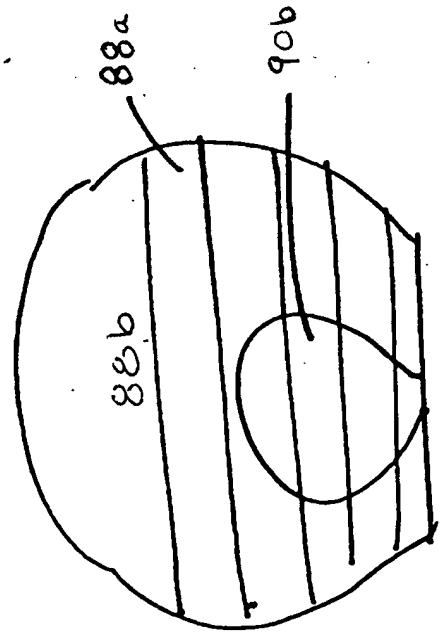


FIG. 5B

EV 059040504 US

82'

NW			Nl		Nr		NE
	nw x	NL x	Nl x	Nr X	nR x	ne x	
	Uw x	UL o	Ul o	Ur o	UR o	Ue x	
uW	uw x	uL o	ul 91a	ur 91b	uR o	ue x	uE
lW	lw x	lL o	ll 91c	lr 91d	lR o	le x	lE
	Lw x	LL o	Ll o	Lr o	LR o	Le x	
SW			Sl	Sr			SE
-							

92

Fig. 5D

Patent Application Publication

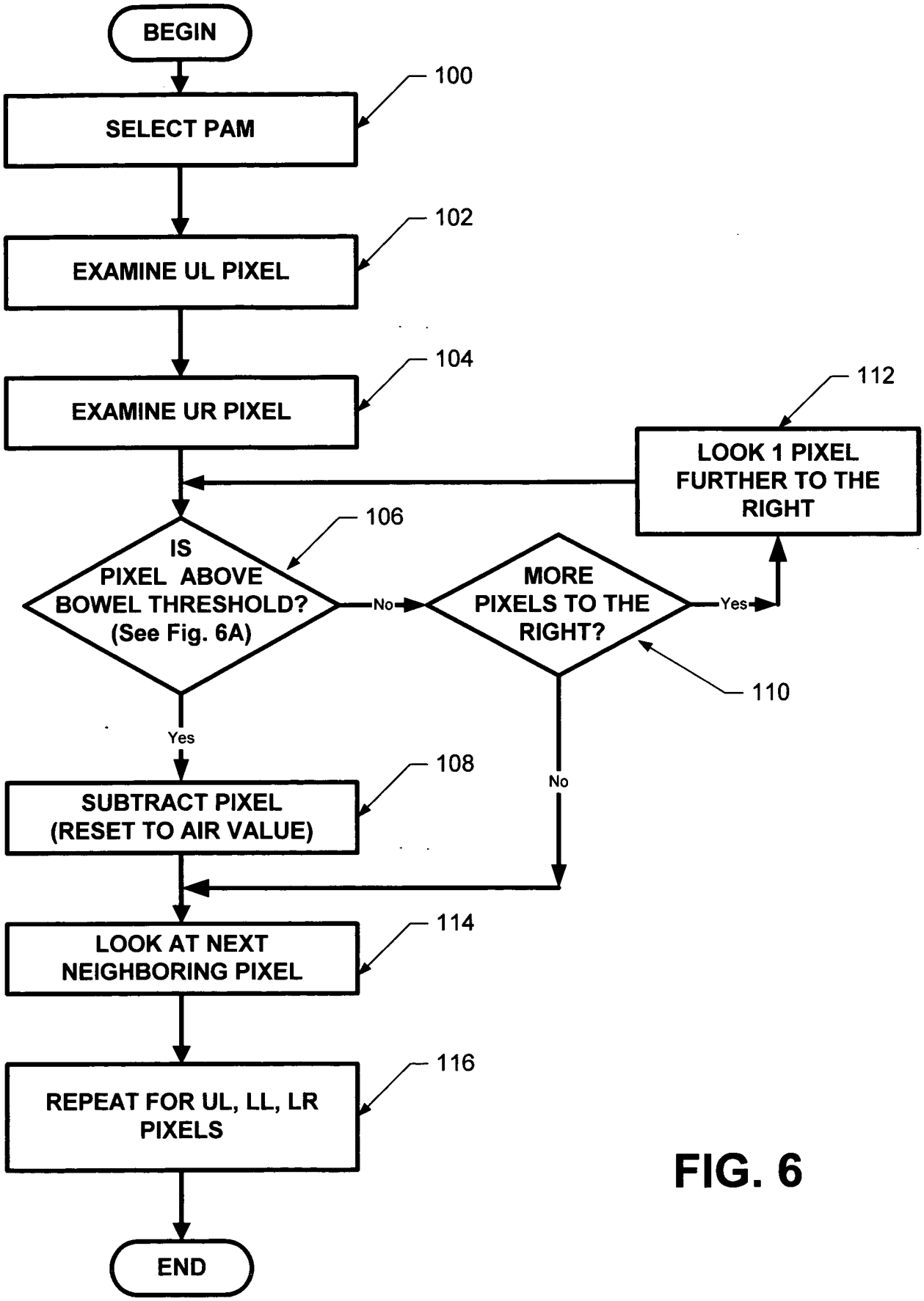

BEGIN
100
SELECT PAM
102
EXAMINE UL PIXEL
104
EXAMINE UR PIXEL
112
LOOK 1 PIXEL FURTHER TO THE RIGHT
106
IS PIXEL ABOVE BOWEL THRESHOLD? (See Fig. 6A)
No
MORE PIXELS TO THE RIGHT?
Yes
110
Yes
No
108
SUBTRACT PIXEL (RESET TO AIR VALUE)
114
LOOK AT NEXT NEIGHBORING PIXEL
116
REPEAT FOR UL, LL, LR PIXELS
END

FIG. 6

Fig. 6A

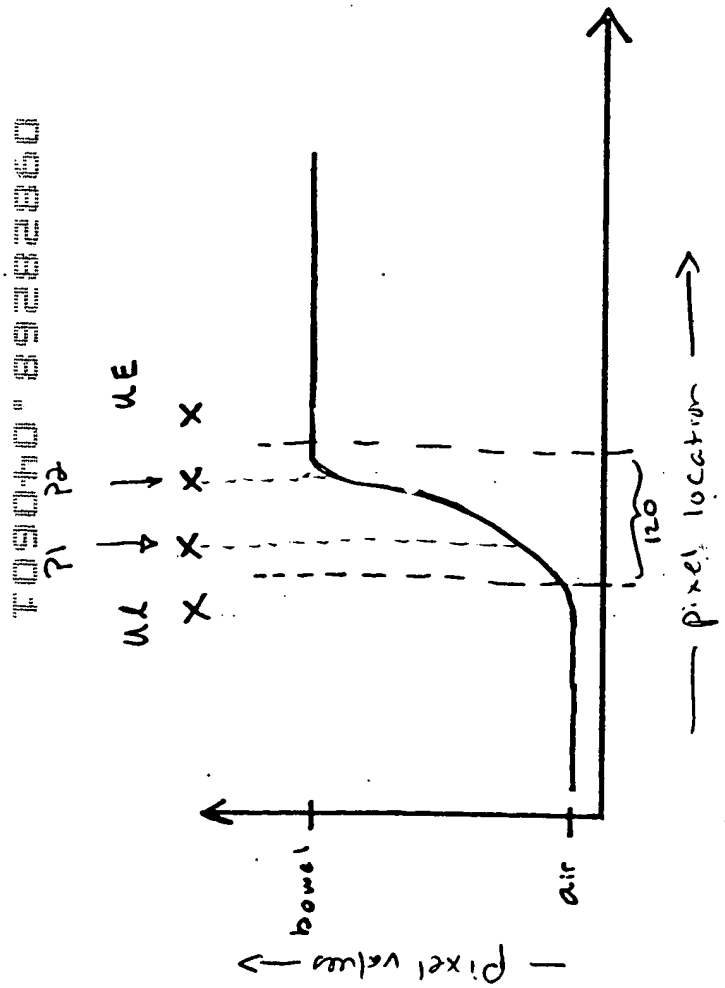
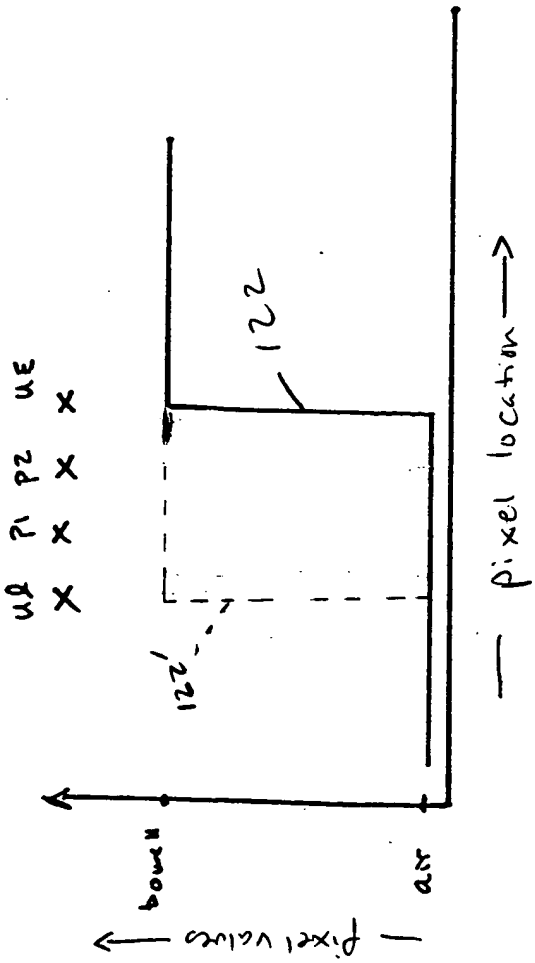

pixel location
120
pixel value
bowel
air
pE
p1
uE
un

Fig. 6B


pixel location
122
121
pixel value
bowel
air
pE
p1
uE
un

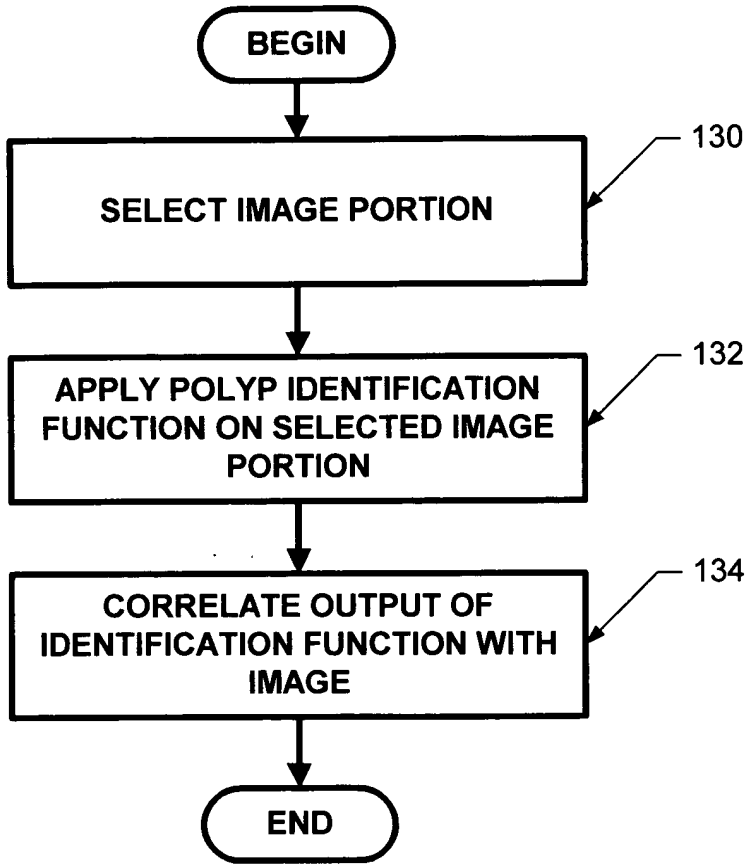


FIG. 7

Patent Application Publication

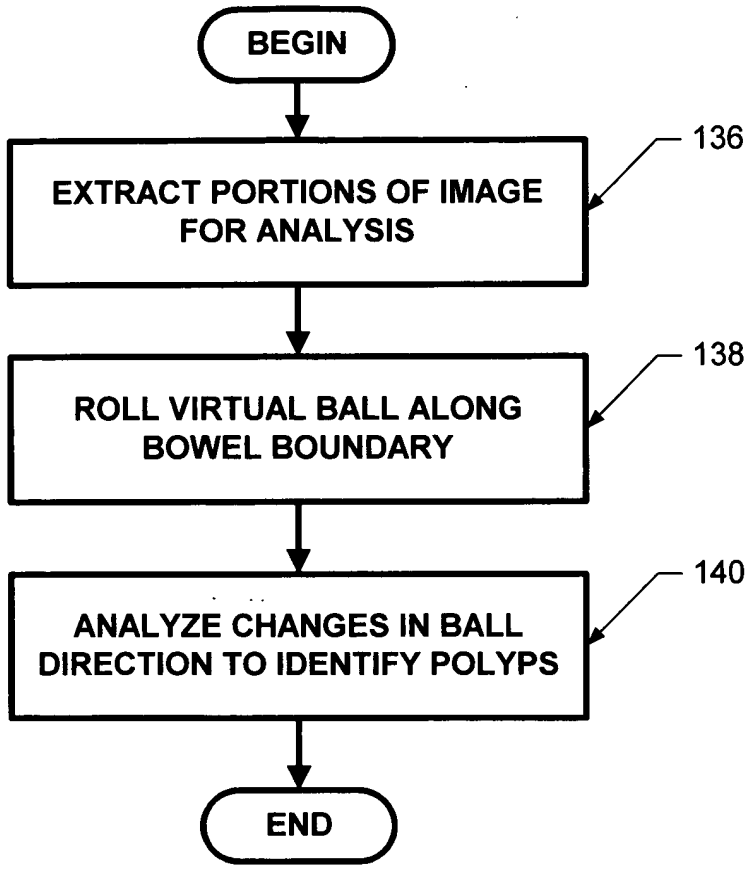

BEGIN
EXTRACT PORTIONS OF IMAGE FOR ANALYSIS
136
ROLL VIRTUAL BALL ALONG BOWEL BOUNDARY
138
ANALYZE CHANGES IN BALL DIRECTION TO IDENTIFY POLYPS
140
END

FIG. 8

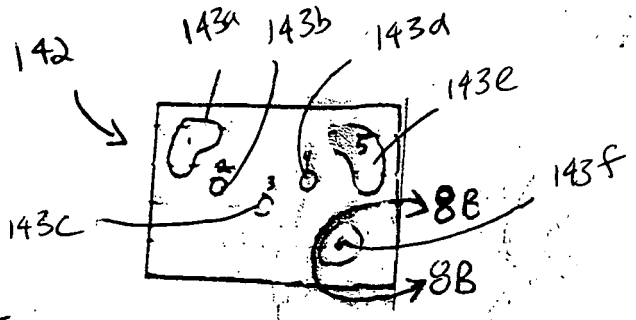


Fig. 8A

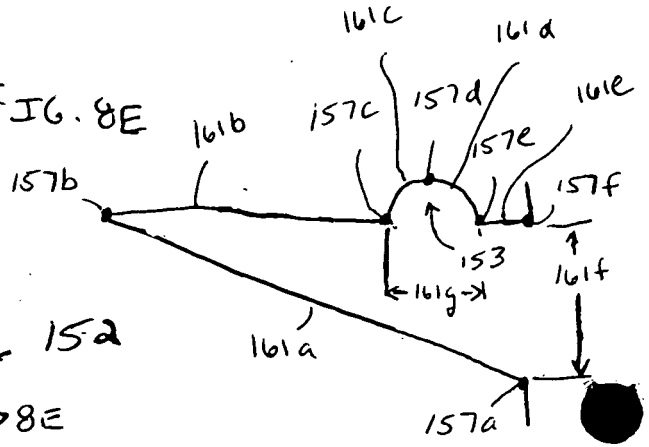


FIG. 8E

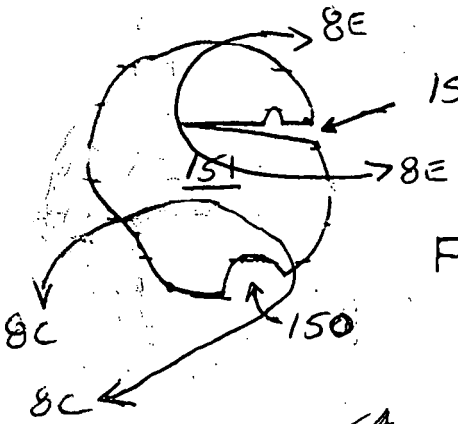


FIG. 8B

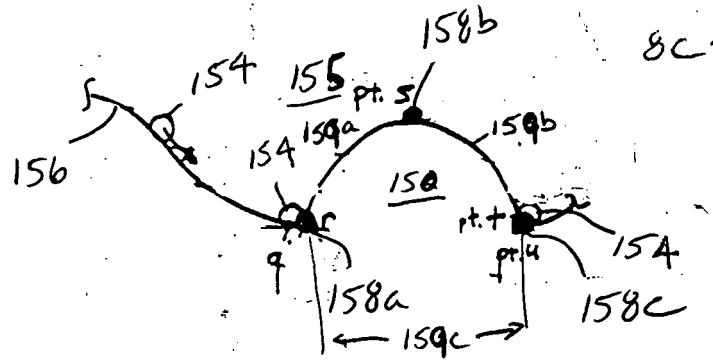


Fig. 8C

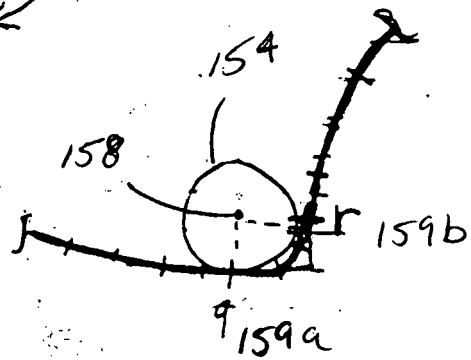


FIG. 8D

SYSTEM FOR DIGITAL BOWEL SUBTRACTION AND POLYP DETECTION AND RELATED TECHNIQUES
Michael E. Zalis
CASE NO. MGH-005AUS
16/21

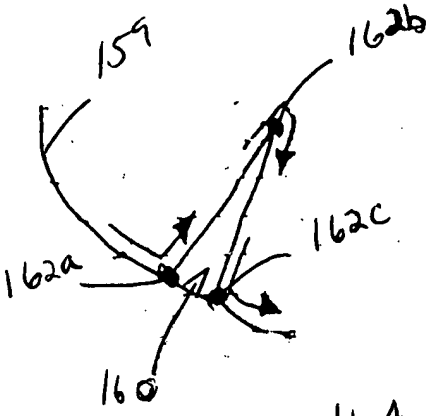


Fig. 8F

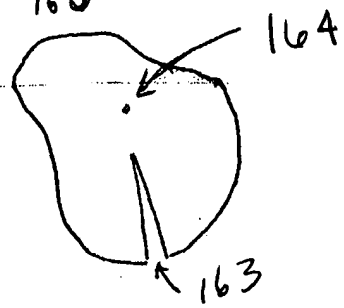


Fig. 8G

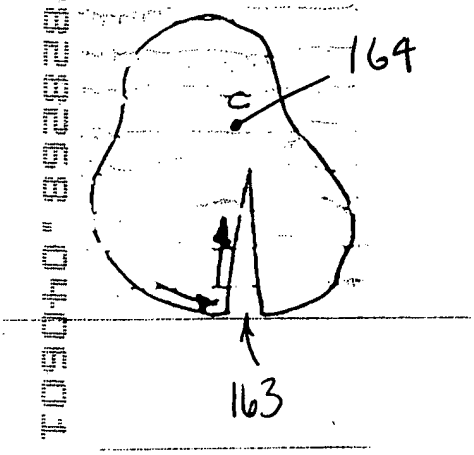


Fig. 8H

09838568 - 042606

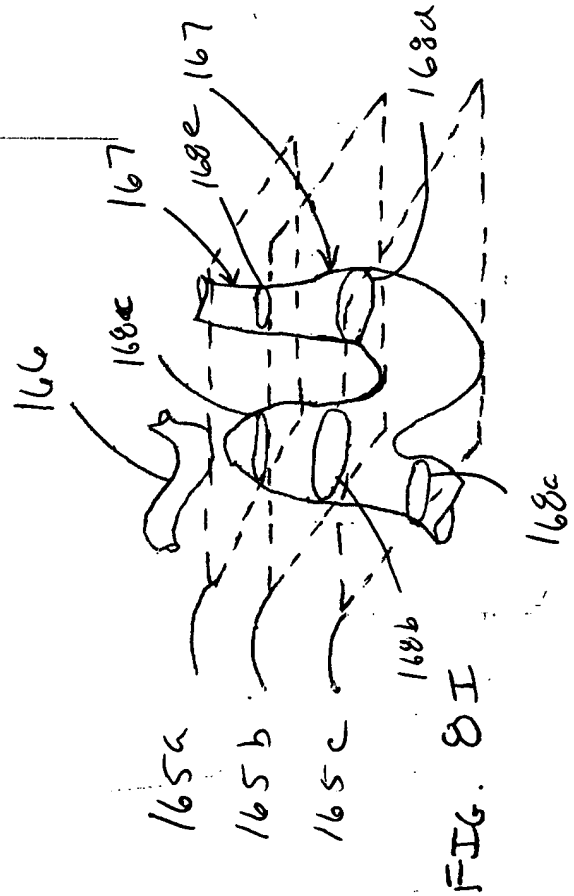


FIG. 8I

EP 0904740 A2 19990331

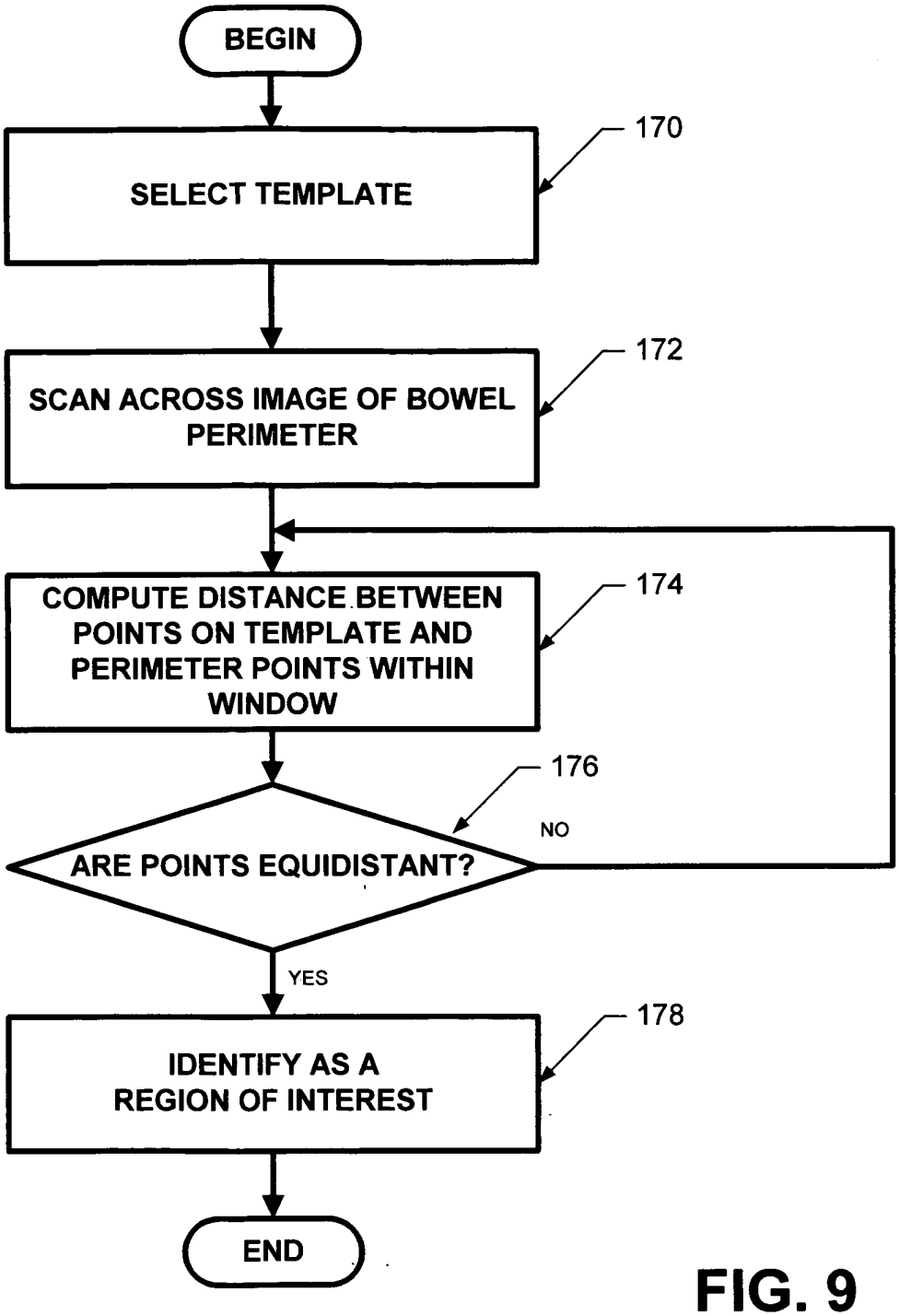


FIG. 9

Docket No. 0402.68250

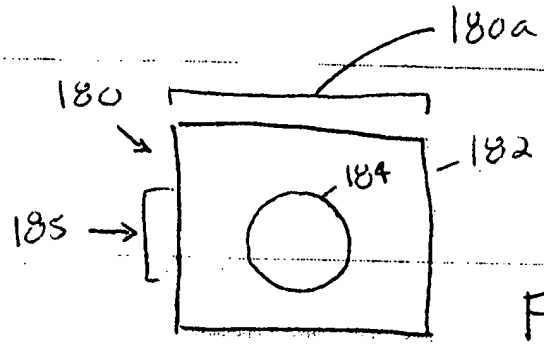


Fig. 9A

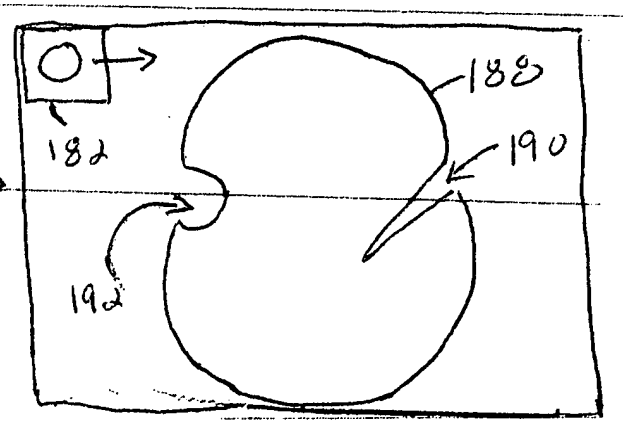


Fig. 9B

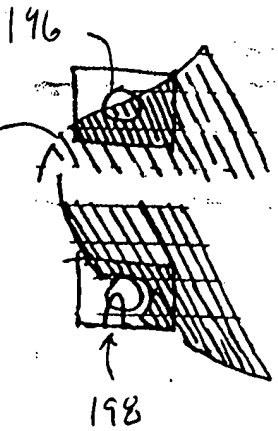


Fig. 9C

Fig. 9D

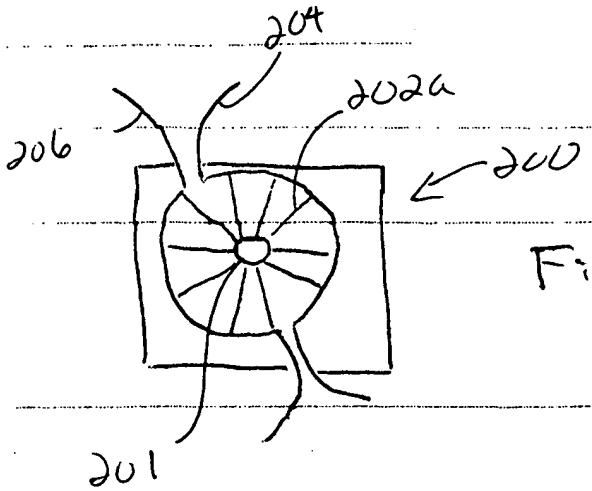


Fig. 9E

09826259 - 040604

Fig. 9G

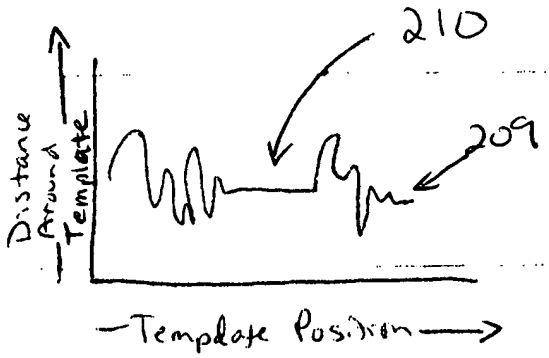
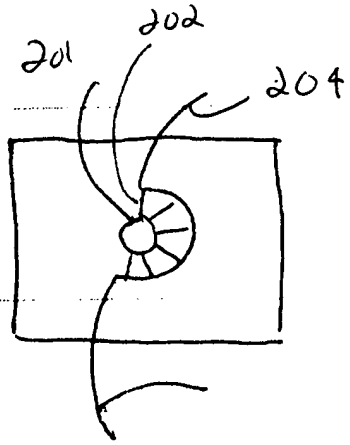



Fig. 9F